

This listing of claims will replace all prior versions of the claims in the application:

Listing of Claims:

--1. (Currently amended) A material classifier for washing, classifying and dewatering a liquid-solid mixture containing solid material ~~to be separated~~, comprising:

a first tank defining a reservoir having a first end at which for receiving the liquid-solid mixture is received and a second end from which liquid from the liquid-solid mixture is discharged, the tank including an angled side wall located between the first end and the second end; and

a first wheel angularly mounted at least partially within the first tank adjacent the side wall to rotate about a first wheel axis that is tilted at an angle relative to a horizontal reference and that is substantially perpendicular to the side wall, the first wheel having a plurality of spaced apart radially extending scoops about a periphery thereof for scooping up a first grade of solid material from within the first tank and subsequently discharging the scooped solid material from the side wall to outside of the first tank during rotation of the first wheel; and

a second wheel mounted at least partially within the tank adjacent the side wall and further from the first end than the first wheel to rotate about a second wheel axis that is tilted at an angle relative to a horizontal reference and that is substantially perpendicular to the side wall, the second wheel having a plurality of spaced apart radially extending scoops about a periphery thereof for scooping up a second grade of solid material from within the tank and subsequently discharging the scooped solid material from the side wall to outside of the tank during rotation of the second wheel.

2. (Currently amended) The material classifier of claim 1 wherein the first tank includes a side wall located adjacent to and substantially conforms conforming to a downwardly oriented first side of the first wheel for impeding scooped solid material from discharging from the scoops of the first wheel while rotating inside the first tank, the side wall having an upper edge portion

over which the scoops of the first wheel discharge scooped solid material from the first side of the first wheel when rotated higher than the upper edge portion and the side wall substantially conforms to a downwardly oriented first side of the second wheel for impeding scooped solid material from discharging from the scoops of the second wheel while rotating inside the tank, the side wall having a further upper edge portion over which the scoops of the second wheel discharge scooped solid material from the first side of the second wheel when rotated higher than the further upper edge portion.

3. (Currently amended) The material classifier of claim 2 wherein the side wall is substantially planar, and substantially perpendicular to the first wheel axis.
4. (Original) The material classifier of claim 2 wherein the tilt of the first wheel axis relative to the horizontal reference is greater than zero degrees and equal to or less than fifty degrees.
5. (Original) The material classifier of claim 4 wherein the tilt of the first wheel axis relative to the horizontal reference is greater than 30 degrees.
6. (Currently amended) The material classifier of claim 2 wherein the first wheel includes an inner hub from which the scoops thereof extend radially, the scoops of the first wheel each including a scoop wall terminating in an outer scoop edge, the scoops of the first wheel each being substantially open sided on a side thereof at the first side of the first wheel such that scooped material thereon is at least partially supported by the side wall prior to being discharged for permitting scooped material to discharge from the scoops at the first side of the first wheel as the scoops of the first wheel rotate above the upper edge portion of the side wall, and
the second wheel includes an inner hub from which the scoops thereof extend radially, the scoops of the second wheel each including a scoop wall terminating in an outer scoop edge, the scoops of the second wheel each being substantially open sided on a side thereof at the first side of the second wheel such that scooped material thereon is at least partially supported by the

side wall prior to being discharged from the scoops at the first side of the second wheel as the scoops of the second wheel rotate above the further upper edge portion of the side wall.

7. (Currently amended) The material classifier of claim 6 wherein the outer scoop edges of at least some of the scoop walls of the scoops of the first wheel are substantially parallel to the first wheel axis.
8. (Currently amended) The material classifier of claim 6 wherein the outer scoop edges of at least some of the scoop walls of the scoops of the first wheel are angled such that the outer scoop edges of the scoops of the first wheel angled scoop wheels are not parallel to the first wheel axis.
9. (Currently amended) The material classifier of claim 8 wherein the angled outer scoop edges of the scoops of the first wheel are angled to be substantially parallel to a predetermined fill level for the liquid-solid mixture in the tank when the angled outer scoop edges of the scoops of the first wheel are located at the predetermined fill level.
10. (Currently amended) The material classifier of claim 6 wherein at least some of the scoops of the first wheel have scoop walls that taper from the first side of the first wheel to a second side thereof.
11. (Currently amended) The material classifier of claim 6 wherein the inner hub of at least one of the first and second wheels includes a substantially cylindrical wall from which the scoops extend, at least some of the scoops having a width greater than that of the cylindrical wall.
12. (Currently amended) The material classifier of claim 1 wherein at least one section of scoops of the first wheel are connected together as a unit removable from the first wheel.

13. (Currently amended) The material classifier as claimed in claim 6, wherein the scoop wall of at least some of the scoops of at least one of the first and second wheels defines a concave region which opens in the direction of rotation of the at least one of the first and second wheels first wheel.

14. (Currently amended) The material classifier as claimed in claim 6, wherein the scoop wall of at least some of the scoops of the first wheel defines a cavity or hollow which opens in the direction of rotation of the first wheel.

15. (Currently amended) The material classifier as claimed in claim 6, wherein the first tank further includes a bottom wall that is adjacent to a lower end of the first wheel and is substantially perpendicular to the side wall.

16. (Cancelled)

17. (Currently amended) The material classifier of claim [[16]] 1 including independently controllable drives for the first wheel and second wheel for rotating the first wheel and second wheel at different speeds relative to each other, and the first wheel is located in a first tank portion and the second wheel is located in a second tank portion, the material classifier further including a variable gate between the first and second tank[[s]] portions for controlling respective liquid-solid mixture levels therein.

18. (Cancelled)

19. (Currently amended) The material classifier of claim [[16]] 1 further including:

~~a third tank connected to the second tank for receiving some of the liquid-solid mixture from the second tank;~~

~~a third wheel angularly mounted at least partially within the third tank adjacent the side wall and further from the first end than the second wheel to rotate about a third wheel axis that is~~

tilted at an angle relative to the horizontal reference and that is substantially perpendicular to the sidewall, the third wheel having a plurality of spaced apart radially extending scoops about a periphery thereof for scooping up a third grade of solid material from within the third tank and subsequently discharging the scooped solid material from the side wall to outside of the third tank during rotation of the third wheel;

independently controllable drives for each of the wheels for rotating the wheels at separately controllable speeds; and

variable gates in the tank between the first and second wheels tanks and the second and third wheels tanks for controlling the flow of liquid-solid mixture therebetween.

20. (Currently amended) The material classifier of claim [[16]] 1, wherein the first and second wheels rotate in opposite directions.

21. (Currently amended) The material classifier of claim [[16]] 1, wherein the first and second wheels rotate in an upstream direction.

22. (Currently amended) The material classifier of claim [[16]] 1, wherein the first and second wheels rotate in a downstream direction.

23. (Currently amended) The material classifier of claim [[16]] 1, including a frame on which the first tank and second tank are tank is mounted, the frame having transport wheels at least one end thereof.

24. (Currently Amended) The material classifier of claim 1, wherein the first tank has a feed hopper at the [[a]] first end thereof for feeding the liquid-solid mixture into the tank, and an exit gate at an opposite the second end facing the first end, the first wheel and the second wheel being offset to one side of a flow-path through the first tank from the feed hopper at the first end to the exit gate at the second end.

Claims 25 – 26 (Cancelled).

27. (Currently amended) A method of washing, classifying and dewatering material, comprising:

providing a scoop wheel first and second scoop wheels each having a plurality of scoops located about a periphery thereof and mounted to rotate about a respective scoop wheel axis that is tilted relative to a horizontal reference, the scoop wheels being serially arranged one after the other in a tank with the wheel axes thereof being substantially perpendicular to a flow direction of liquid through the tank, each scoop wheel having a downwardly oriented first side and being located in a, the tank having an upwardly extending wall adjacent the first sides of the scoop wheels, the wall having an upper limit above which the scoops extend during rotation;

adding a liquid-solid mixture to [[the]] a first end of the tank to a predetermined fill level;
rotating the first scoop wheel to scoop settled solid material of a first grade from a bottom of the tank and then subsequently;

rotating the scoop wheel further to discharge the scooped material from the first side of the first scoop wheel when the scooped material over an upper edge portion of the wall; is above the upper limit;

rotating the second scoop wheel to scoop settled solid material of a second grade from the bottom of the tank and then subsequently discharge the scooped material from the first side of the second scoop wheel over a further upper edge portion of the wall; and

discharging liquid from a second end of the tank.

28. (Original) A material classifier for classifying a liquid-solid mixture having various grades of solid material therein, comprising:

(a) a first classifier stage for removing a first predetermined grade of solid material from the liquid-solid mixture, including:

a first tank for receiving the liquid-solid mixture;

a first wheel rotatably mounted at least partially within the first tank, the first

wheel having a plurality of spaced apart radially extending scoops about a periphery thereof for scooping up solid material from within the first tank and subsequently discharging the scooped solid material outside of the first tank during rotation of the first wheel;

(b) a second classifier stage for removing a second predetermined grade of solid material from the liquid-solid mixture, including:

a second tank connected to the first tank for receiving some of the liquid-solid mixture from the first tank; and

a second wheel rotatably mounted at least partially within the second tank, the second wheel having a plurality of spaced apart radially extending scoops about a periphery thereof for scooping up solid material from within the second tank and subsequently discharging the scooped solid material outside of the second tank during rotation of the second wheel; and

(c) independently controllable drives for the first wheel and the second wheel for rotating the first wheel and second wheel at different speeds relative to each other, and a variable gate between the first and second tanks for controlling respective liquid-solid mixture levels therein.

29. (Currently amended) A material handling system comprising:

a tank for receiving particulate material, the tank having a substantially planar sidewall portion that is non-parallel to a vertical reference when the material handling system is in a use position, the sidewall portion defining a discharge edge at an upper portion thereof over which particulate material can be discharged outside of the tank; and

a scoop wheel rotatably mounted within the tank to rotate about an axis that is substantially perpendicular to the sidewall portion and that is non-parallel to a horizontal reference when the material handling system is in the use position, the scoop wheel having a first side that is substantially parallel to the sidewall portion, the scoop wheel having a plurality of circumferentially spaced scoops for scooping particulate material from within the tank as the scoop wheel rotates and subsequently discharging the scooped particulate material over the discharge edge, the scoops each having a substantially open end at the first side of the scoop wheel facing the sidewall portion, the scoops being arranged on the scoop wheel with the open

ends thereof being closely spaced to the sidewall portion as the scoops rotate thereby to impede scooped particulate material from discharging from the scoops until the scoops rotate above the discharge edge.

30. (New) The method of claim 27 including recombining in selected amounts the material discharged from the tank by the first and second scoop wheels.--